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THE MUSICAL TIMES,
And Singing Class Circular.
SEPTEMBER 1st, 1862.

A DRAUGHT FOR THE PARTICULAR HISTORY OF PHONICS: OR, THE DOCTRINE OF SOUND AND HEARING.

From Lord Bacon's "Sylva Sylvarum."

Introduction.

Sound is a capital thing, and a great secret in nature; as having a virtue that may be called incorporeal: whereof there are but few other instances. And besides the more obvious uses of an enquiry into this subject, it affords a proper exercise to the understanding, by mixing the contemplation of spiritual species, and operations at a distance, with the consideration of such things as operate only by a communication of substance to the touch. Whence the mind now called off from matter, may be rectified, and taught to become impartial. But certain observations upon sounds, having given birth to the art of music, it happens here, as it generally does, that when experiments and observations are grown into an art, the mathematical and practical parts of that art improve, whilst its physical part is deserted. It has fared somewhat better with optics; which considers not only painting, beauty and symmetry, but all visible object ; whereas music confines itself only to harmonic tones; which is a narrow field: but the business of sound and hearing should be well laboured in all its parts, and brought into a full and extensive history.

A TABLE OF ENQUIRY, FOR THE PARTICULAR HISTORY OF PHONICS.

Section I.—Of the existence and non-existence of sounds.

II.—Of the production, conservation, and propagation of sounds.

III.—Of the magnitude, smallness, and damps of sounds.

IV.—Of the loudness, or softness of sounds, and their propagation to longer and shorter distances.

V.—Of the communication of sounds.

VI.—Of the equality and inequality of sounds.

VII.—Of the more treble and more bass tones, or musical sounds.

VIII.—Of the proportion of treble and bass tones.

IX.—Of external and internal sounds.

X.—Of the articulation of sounds.

XI.—Of the duration of sounds ; and the time they require in their generation or propagation.

XII.—Of the direction of sounds.

XIII.—Of the passage and interception of sounds.

XIV.—Of the medium of sounds.

XV.—Of the figures of the concaves, or bodies through which sounds are conveyed.

XVI.—Of the mixture of sounds.

XVII.—Of the melioration of sounds.

XVIII.—Of the imitation of sounds.

XIX.—Of the reflection of sounds.

XX.—Of the relation and difference betwixt light and sound.

XXI.—Of the sympathy and antipathy of sounds with one another.

XXII.—Of the means of hindering or improving the hearing.

XXIII.—Of the spiritual and fine nature of sounds.*

SECTION I.

OF THE EXISTENCE AND NON-EXISTENCE OF SOUNDS.

Let us first consider what great motions there are in nature, that pass without sound or noise. The heavens revolve in a rapid motion, without noise; though, by some dreamers, they have been said to make excellent music. The motions of the comets yield no music. And if it be thought that the greatness of their distance will not let the sound be heard, we say that lightnings, and corruscations, which are near at hand, yield no sound: yet in all these, there is a percussion and separation of the medium.

The winds in the upper region blow without noise. The lower winds, in an open plain, make no noise, unless they be violent, but among trees their noise is perceptible. And the sound of winds is generally unequal, or in the way of rising and falling; and sometimes, when vehement, trembling at the height of their blast.

Rain or hail, though falling violently, yield no noise in passing through the air, till they reach the ground, water, houses, or the like. The water of a river is not heard in the channel; but runs silent, if it be of any depth ; whilst the smaller streams upon shallows of gravel, or pebble, make an audible noise. And waters when they beat upon the shore, or are straitened, as in the falls of bridges, or when dashed against themselves by winds, make a loud roaring.

Any piece of timber, or hard body, being thrust forwards by another contiguous to it, without knocking, gives no noise. And so, bodies weighing upon one another, though the upper press the lower, make no noise. Thus the motion in the minute parts of any solid, passes without sound; the sound being here produced only by the breaking of the air, and not by the impulse of the parts: so that where the anterior body gives way as fast as the posterior comes on, no noise is made, be the motion ever so great or swift.

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* These are the several articles, or heads of enquiry, which occur upon their first sedate consideration of the subject; and which being duly enlarged, enquired into, and the necessary experiments, observations, and instances produced, lead to a knowledge of its nature and properties ; or what, in the language of the author, is termed its form. But till these articles are all filled up, the instances produced, the whole extended, verified. and deduced into axioms, it is no more than a Sylva, or bare collection of the materials for a particular history of phonics.

Air open, and at large, makes no noise, unless it be sharply struck; as in the sound of a string; where the air is briskly struck by a hard and stiff body; for if the string be not strained, it makes no noise. But where the air is confined and straitened, the breath, or other blowing, with a gentle percussion, suffices to create sound; as in pipes and wind instruments. But in flutes, which require only a soft breath, the concavity of the instrument would yield no sound, were it not for the fipple that straitens the air. Other wind-instruments, as trumpets, cornets, horns, &c., require a forcible breath; as appears by the inflated cheeks of the blower. Organs also are blown with a strong wind, by the means of bellows. And some kinds of wind-instruments are sounded at a small hole on the side, which straitens the breath at the first entrance: and this the rather, on account of their traverse and stop above the hole; which performs the part of the fipple in flutes and fifes, that give no sound when blown at the wrong end, as recorders do. So in whistling, it is usual to contract the mouth; and to make the tone more sharp, they sometimes use the finger. But if a stone, or a dart, be thrown in the open air, they give no sound: no more do bullets, unless they happen to be a little hollowed in the casting; which hollowness receives and confines the air. Arrows, likewise, whiz not in their flight, except their feathers are ruffled, which likewise obstructs and confines the air. But small whistles give a sound, on account of their extreme slenderness; whereby the air is more confined than in a wider bore. Again, the voices of men, and other animals, pass through the throat, which confines the breath. The jews-harp requires but a small percussion, and has also the advantage of confining the air in the mouth.

Solid bodies, if gently struck, give no sound; as when a person treads softly upon a floor. So chests or doors in dry weather, when they open easily, make no noise: and cart-wheels squeak not if they are greased. The flame of tapers, though it be a swift motion, and breaks the air, yet passes without sound. The air in ovens, though it doubtless boils, as it were, dilates itself, and is beat back; yet makes no noise. Flame repulsed by air, affords a noise, as in blowing the fire with bellows; greater than if the bellows were to blow upon the air itself. So likewise flame striking the air strongly, makes a sound; and great flames roar whilst one impels another.

There goes a rumour of a kind of white gunpowder, which will discharge a piece without noise; and it is a dangerous experiment if true. But it seems to me impossible; for if confined air be driven out, and strike the open air, it will certainly make a noise. As for the white powder, it may be a mixture of nitre, sulphur, and a little camphire, without coal; for nitre alone will not take fire; nor is it probable that the sound should be damped or deadened by discharging the condensed air before it comes to the mouth of the piece and the open air, for it will thus only make more divided sounds. If it were possible there should be no air confined at the mouth of the piece, the bullet might go away with little noise; for the percussion of the flame upon the bullet makes no noise; the bullet in passing through the air makes but little; and if no confined air were to strike upon the open air, there is no cause of sound; yet the bullet's motion will not be stopped. So that the trial may be made, by filling a little hollow metalline cylinder with powder, and laying the bullet in the mouth of it, so as to reach half out into the open air.

I heard it affirmed by a great, though vain, dealer in secrets, that there was a conspiracy, which himself hindered, to have killed Queen Mary, sister to Queen Elizabeth, by a burning-glass, from the leads of the house, as she walked in St. James's Park. And if burning-glasses could be brought to a great degree of strength, (and they talk of glasses able to fire a navy) the percussion of the air alone, by such a burning-glass, would make no noise; any more than corruscations and lightnings, without thunder.

I suppose the impression of the air by sounds requires time to reach the sense, as well as the impression of visible objects; and will not otherwise be heard. Therefore, as a bullet from a cannon moves so swift as to be invisible, the same swiftness of motion makes it inaudible; for the apprehension of the eye is quicker than that of the ear.

All eruptions of the air, though small and light, cause the sounds called crackling, puffing, spitting, &c., as in salt, bay-leaves, and chestnuts, thrown into the fire; so candles will spit flame, if they be wet, &c.

SECTION II.

THE PRODUCTION, CONSERVATION, AND PROPAGATION OF SOUNDS.

The cause commonly assigned of sound, viz., the elision of the air, is but a term of ignorance; and the motion but a catch of the wit upon a few instances; as the manner is, in the received philosophy. And it is a common way with men, when once they have got a pretty expression, or a term of art, by the end, to let it go current, though it be empty of matter. This conceit of elision appears manifestly false, because the sound of a bell, a musical string, or the like, continues melting for some time after the percussion; but ceases presently, if the bell or string be touched and stayed; whereas if an elision of the air made the sound, the touch of the bell or string could not so suddenly extinguish the motion caused by an elision of the air. This appears still more plain by chiming, with a hammer, upon the outside of a bell; for the sound will thus be made according to the inward concave of the bell; whereas the elision of the air can be only between the hammer and the outside of the bell. So again, if elision were the cause, a broad hammer, and a bodkin, struck upon metal, would give different tones, as well as a different loudness, which they do not; for though the sound of the one be louder, and of the other softer, yet the tone is the same. Besides in echoes, whereof some are as loud as the original voice, there is no new elision, but only a repercussion. These and the like conceits will scatter and break up like a mist, when men shall have cleared their understanding by the light of experience.

It is certain, that sound is not produced at the first without some local motion of the air, flame, or other medium; nor without some resistance, either in the medium or body struck. For a mere yielding, or cession, produces no sound. And herein sounds differ from light and colours, which pass through the air, or other medium, without any local motion of the air, either at the first or after. But we must attentively distinguish between the local motion of the air, and the sounds conveyed in the air. As to the former, we manifestly perceive that no sound is produced without a perceptible blast of the air, or without some resistance of the air that is struck. For even speech, one of the gentlest motions of air, is attended with the expulsion of a little breath. And all pipes or wind instruments have a blast, as well as a sound. We find also that sounds are carried by the wind, and therefore will be heard farther with the wind than against it; and that they likewise rise and fall with the intension or remission of the wind. But for the impression of sound, it is quite another thing; and entirely without any perceptible local motion of the air: in which it resembles vision; for after a bell is rung, we discern no perceptible motion of the air in the track where the sound goes, but only at the first. Nor does the wind, in carrying a voice, by its motion confound any of the delicate and articulate figurations of the air, in the variety of words. And to speak loud against the flame of a candle, will not make the flame tremble considerably; though most when those letters are pronounced which contract the mouth; as F, S, U, &c. But gentle breathing, or blowing, without speaking, will move the flame much more. And probably sound is the rather without any local motion of the air; because, as it differs from sight, in requiring a local motion at first, so it resembles it in many other things, which induce no local motion.

On the other hand, glass windows will shake with thunder, and the firing of ordnance; and fishes are thought to be frighted with the motion caused by noise upon the water: but these effects proceed from the local motion of the air, which is a concomitant of the sound, and not from the sound itself. It is also said, that violent shoutings of people in great multitudes have so rarified the air that birds upon the wing have fallen down; the air being thus rendered unable to support them. And it is believed by some, that violent ringing of bells in populous cities has chased away thunder, and also dissipated pestilent air: all which, if real, may proceed from the concussion of the air, and not from the sound. A very great sound, near at hand, has struck many with deafness: and at the instant they have found, as it were, the breaking of a skin or parchment in their ears: and myself standing near a person who luted loud and shrill, suddenly received an injury; as if somewhat had broke, or been dislocated in my ear; and immediately after ensued the sensation of a loud ringing; so that I apprehended some deafness: but it vanished in half a quarter of an hour. This effect may be justly referred to the sound; for an over potent object destroys the senses: and spiritual species, both visible and audible, will affect the sensories, though they move no other body.

In the propagation of sounds, enclosure of them preserves, and carries them farther. Thus in rolls of parchment, or shooting trunks, the mouth being applied to one end of the roll or trunk, and the ear to the other, the sound is heard much farther than in the open air: for the sound spends and dissipates in the open air; but is conserved and contracted in such concaves. So, if one man speak in the touch-hole of a piece of ordnance, and another apply his ear to the mouth of the piece, the sound is much better heard than in the open air. It is farther to be considered, what the event will prove, when the sound is not enclosed all the length of its way, but passes in part through open air; as when one speaks at some distance from a shooting trunk; or where the ear is at some distance from the other end of the trunk; or where both the mouth and ear are distant from the trunk. It has been found that in a trunk of eight or ten foot, the sound is helped, though both the mouth and the ear be four or five inches from the ends of the trunk: and somewhat farther assisted when the ear of the hearer, than when the mouth of the speaker, is near. And it is certain, that a voice is better heard within a chamber from without, than without from within the chamber. And as an entire enclosure preserves the sound, so does a semi-concave, though in a less degree. Therefore, if a person speak at one end of a half tube, or trunk, and you lay your ear to the other, this will carry the voice farther, than to speak in the air at large. Nay, if it be not a semi-concave; but the like be done along the mast of a ship, or the outside of a piece of ordnance, though this be on a convex surface, the voice will be heard farther than in the open air. It should be tried, how, and with what proportion of disadvantage, the voice will be carried in a horn, or an arched line; or in a trumpet, which is a retorted line; or in a pipe, that is sinuous.

It is certain, that sounds are producible without air: though this be the most favourable medium thereof. For a pair of tongs opened and shut at some depth within water, may be heard without any great diminution of the sound; though there is no air at all present. Take one vessel of silver, and another of wood, fill each of them with water, and then strike the tongs together, as before, about four inches from the bottom; and the sound in the silver vessel will be much more resonant than in that of wood: yet if there be no water in the vessel, so that the tongs play in the air, there will be no difference between the sound coming from the silver or the wooden vessel. Whence, besides the capital point of producing sound without air, we may collect, that the sound communicates with the bottom of the vessel; and that such a communication passes better through water than air.

Strike any hard bodies together, in the midst of flame; and the sound will differ little from the sound in air.

The pneumatical part, which is in all tangible bodies, and has some affinity with air, performs, after a sort, the office of the air: thus the sound of an empty barrel is in part created by the air on the outside, and in part by that in the inside: for the sound will be less, or greater, as the barrel is more or less empty: though it communicates also with the spirit in the wood, through which it passes from the outside to the inside. So likewise in the chiming of bells on the outside; the sound passes to the inside.

It were gross to think, that the sound in strings is produced between the finger and the string: for these are but preparatories to the production of the sound, which is formed between the string and the air; and that not by any impulse of the air, from the first motion of the string; but by the return of the string (now strained by the touch) to its former place: which motion of return, is quick and sharp; whereas the first motion is soft and dull. So the bow tortures the string continually, and thereby holds it in a constant trepidation.

(*To be continued.*)

TO CORRESPONDENTS.

An Amateur Organist *who requires a music book for psalm and hymn tunes, should apply himself to our publishers, where he will probably find what he requires.*

Musicus *wishes to be informed of the name of the organist at the late Handel Festival, and asks why he was not mentioned in the different newspaper accounts of the festival. The organist was Mr. Brownsmith, and we can only suppose that his not having been particularly mentioned arose purely from an oversight; we must certainly plead that excuse for ourselves. Mr. Brownsmith is always deserving of praise, and his performance at the late festival was all that could be desired; he displayed excellent judgment and great steadiness, and there is no doubt he contributed very materially to the success of the undertaking.*

W.H.T. *is referred to Messrs. Cramer and Co., of Regent Street, for a work on National Music, by Mr. W. Chappell; and he will no doubt obtain information respecting national anthems, from Sir J. Hawkins' History of Music, published by Novello and Co.*

Brief Chronicle of the last Month.

Ashwell, Herts.—On the 1st of August the singing class of this village performed a selection of sacred and secular glees, under the direction of Mr. Norman. Refreshments were provided for the company, who numbered about 250.

Bluntisham.—The Choir of Bluntisham Chapel gave a concert of sacred and secular music on Wednesday, the 6th ult., under the direction of their conductor, Mr. John Wheatley. There was a marked advance in the performance generally.

Burnley.—The new organ at the West-gate Congregational Chapel was opened on the 30th of July, by Mr. Best, organist of St. George's Hall, Liverpool. Several excellent compositions were played by Mr. Best, in admirable style, including the *Andante* from Haydn's Quartett in F; an *Andantino* from Spohr's Symphony, "The Power of Sound; and the grand "Hallelujah" chorus from Beethoven's *Engedi.*

Carthorpe.—On the 8th ult. a concert was given at this village, by Mr. Prendergast, who presided at the pianoforte. He was ably assisted by Miss Maria Wilson and Mr. Halgate, a violin player, and a chorus of about thirty singers.

Charlotte Street, Buckingham Gate.—The monthly concert of the Choral Society in connection with St. Peter's Chapel, took place on the 13th of August, under the presidency of the Incumbent, when a good selection of vocal and instrumental music, chiefly from the old masters, was performed. Much praise is due to the organist, Mr. H. Piper, who conducted upon the occasion.

Ecclesiological Society.—A concert took place a the rooms of the Architectural Union on the 30th of July, at which the motett choir of the Ecclesiological Society performed a selection of ancient church music. The principal feature of the programme was Palestrina's Mass, which was sung in latin, and was rendered much more effective by the versicles and prayers, always said by the priest, being chanted by the Rev. Mr. Helmore. The music of Palestrina is wonderfully elaborate, and though there are not three bars of melody throughout, it is a most interesting Mass, containing as it does so much learned contrapuntal writing. The programme also comprised a latin psalm and a latin hymn, which were given in a truly Catholic style; and there were also English hymns and psalms to Gregorian chants. The music had evidently been practised with assiduity, and it must have cost Mr. Helmore's boys considerable time and trouble to master the difficulties. If a few ladies with good voices had been introduced, the soprano part would have been more effective.

Hereford.—A presentation has been forwarded to Mr. George Townshend Smith, organist of Hereford Cathedral, from the stewards of the late musical festival, in testimony of their appreciation of his services as conductor of the music performed on that occasion. This well-deserved tribute of respect for Mr. Smith's services, consists of an inkstand mounted on a shield-shaped stand, around the edges of which, in an embossed border, is a gracefully designed wreath, formed of musical instruments and floral ornamentation, executed with spirit and effect.

Institution for the Blind.—A concert was given on the 18th of August, by the blind pupils of the St. John's Wood Institution, conducted by Mr. Barnes. The performance exhibited the marked improvement which has taken place among the pupils.

Liverpool.—Mr. Best has been giving performances at St. George's Hall upon the grand organ during the last month. The most attractive pieces in the programmes have been a "Romanza" from Haydn's Symphony, *La Reine de France*, and the *Andantino* from Spohr's *Power of*